

IN THE ABSTRACT:

Systems, apparatus, and methods for new generations of wireless systems, including multiple standard, interoperable Third-Generation (3G) and Second-Generation (2G), Spread Spectrum CDMA, WCDMA, GSM, Enhanced GSM systems and CSMA, TDMA and OFDM. Bit Rate Agile (BRA), Modulation and Code Selectable processing techniques of Gaussian Minimum Shift Keying (GMSK), Quadrature Phase Shift Keying (QPSK), Quadrature Amplitude Modulation (QAM), and of Mis-Matched demodulator filters in which the demodulator filter set is mis-matched to the filter set of the signal modulator.

*B2* Receivers and demodulators, including smart diversity receivers, receive-adaptive antenna arrays and receive-adaptive equalizers are described in this invention. Spectral efficient quadrature modulated transmitters-receivers (transceivers), high performance Bit Rate Agile (BRA) modulation-demodulation (Modem) methods and integrated Modems/Transceivers suitable for operation over Non-Linearly Amplified (NLA) power efficient RF systems for enhanced performance and increased capacity bandwidth efficient wireless, PCS, cellular CDMA, TDMA, GSM, OFDM and other efficient communications, broadcasting and telemetry systems are described. Bit Rate Agile (BRA) quadrature demodulators are disclosed. The described receivers are particularly suitable for reception and demodulation of spectral efficient Feher's Quadrature Phase Shift Keying (FQPSK), Feher's Quadrature Amplitude Modulation (FQAM), Feher's Gaussian Minimum Shift Keying (FGMSK) and Feher's Minimum Shift Keying (FMSK) signals. Bit rate and RF agile cascaded mis-matched (ACM) demodulation filters Miss-Matched (MM) to that of the modulator filters, Modem Format Selectable (MFS) and Code Selectable (CS) methods for tunable RF frequency embodiments are described. The 2nd generation of FQPSK systems with Adaptive Antenna Arrays (AAA), Pseudo-Error (PE) based Non-Redundant Error Detection (NRED) and PE controlled IF-adaptive Feher Equalizers (FE) and smart diversity systems has additional enhanced spectral/RF power efficiency and end-to-end performance advantages.